

Listing of Claims

This listing of claims will replace all prior versions and listings of claims in the Application.

1. (CURRENTLY AMENDED) A device for sensing NO_x compounds comprising:
a calix[4]arene compound, ~~wherein the calix[4]arene compound forms capable of forming a stable and reversible~~ complex with at least one NO⁺ cation, wherein a detectable charge-transfer reaction occurs between the at least one NO⁺ cation and the calix[4]arene detectable as a color change, wherein NO⁺ is derived from an oxide of nitrogen in a form other than nitric oxide.
2. (ORIGINAL) The device of claim 1, wherein the detection is selected from the group consisting of visualization, measurement of electrochemical changes, and measurement of spectroscopic changes.
3. (ORIGINAL) The device of claim 1, wherein the complex undergoes dissociation.
4. (ORIGINAL) The device of claim 3, wherein the complex is decolorized.
5. (ORIGINAL) The device of claim 1, wherein the calix[4]arene compound is alternatively a cone calix[4]arene, a 1, 3-alternate calixarene or a combination thereof.
6. (ORIGINAL) The device of claim 1, wherein the calix[4]arene compound is optionally immobilized, in solution, attached to a ligand, attached to a solid support, or any combination thereof.
7. (CURRENTLY AMENDED) The device of claim 1, wherein the charge-transfer reaction is detected in the presence of mixtures selected from the group consisting of H₂O, O₂, HCl, SO_x, NH₃, NO, their derivatives and NO_x compounds~~are optionally a gas, liquid, solution, mixtures of gases, or a combinations thereof.~~
8. (ORIGINAL) The device of claim 1, wherein the complex is a storage device for the NO⁺ cation.
9. (ORIGINAL) The device of claim 1, wherein the complex is capable of transferring the NO⁺ cation to a substrate.

10. (ORIGINAL) The device of claim 1, wherein the complex is stabilized by one or more Lewis acids.

11. (CURRENTLY AMENDED) A device for purifying chemical compounds containing NO_x comprising:

a calix[4]arene compound, wherein the calix[4]arene compound reversibly complexes a NO⁺ cation from the chemical compound and ~~is capable of transferring~~ purifies the chemical compound free of the NO⁺ cation ~~produced from the NO_x and~~ wherein NO⁺ is derived from an oxide of nitrogen in a form other than nitric oxide.

12. (ORIGINAL) The device of claim 11, wherein the calix[4]arene compound is optionally immobilized, in solution, attached to a ligand, on a solid interface, attached to a solid support, or a combination thereof.

13. (ORIGINAL) The device of claim 11, wherein the complex is a storage device for the NO⁺ cation.

14. (ORIGINAL) The device of claim 13, wherein the complex is chemically stable for at least several weeks.

15. (CURRENTLY AMENDED) A method of purifying chemical compounds comprising:

exposing a calix[4]arene compound to a mixture of chemical species containing at least one NO_x compound;

allowing the calix[4]arene compound to interact with the mixture, wherein the calix[4]arene compound forms a stable and reversible complex with an NO⁺ from the NO_x compound ~~complex~~ and wherein NO⁺ is derived from an oxide of nitrogen in a form other than nitric oxide, wherein a detectable charge-transfer reaction occurs between the NO⁺ cation and the calix[4]arene for identification of the NO⁺.

16. (CURRENTLY AMENDED) A molecular container comprising:

a calix[4]arene compound enriched with electron donating groups; and

at least one NO⁺ cation, wherein NO⁺ is derived from an oxide of nitrogen in a form other than nitric oxide, wherein the NO⁺ cation is attracted to an electron donating group, forms a stable and reversible complex with the calix[4]arene compound and wherein the NO⁺ cation is now made available for transfer to a second container that accepts the NO⁺ cation.

17. (ORIGINAL) The molecular container of claim 16, wherein the calix[4]arene compound complexes the NO⁺ cation and is capable of storing it.

18. (ORIGINAL) The molecular container of claim 16, wherein the calix[4]arene compound complexes the NO^+ cation and is capable of transferring it to another substrate.

19. (CURRENTLY AMENDED) An optical switch comprising:

a reversible and stable calix[4]arene-nitrosonium complex formed by noncovalent forces between a calix[4]arene compound and free nitrosonium in which the nitrosonium switches ~~is capable of changing~~ between a free and a complexed state wherein the switching ~~is~~ can be detected optically, wherein the nitrosonium is derived from an oxide of nitrogen in a form other than nitric oxide.

20. (CURRENTLY AMENDED) An optical switch comprising:

a means for reversibly complexing in a stable form a nitrosonium cation by noncovalent forces, wherein the nitrosonium is derived from an oxide of nitrogen in a form other than nitric oxide; and

a means for detecting the presence of the complexed nitrosonium cation.

21. (NEW) The optical switch of claim 19, wherein the calix[4]arene compound is immobilized on a solid support.

22. (NEW) The molecular container of claim 16, wherein the second container is selected from the group consisting of calix[4]arene compound, solid support, and solid interface.

23. (NEW) An improved nitrosating agent comprising:

a compound that reversibly entraps one or more nitrosonium cations in a deep cavity by noncovalent forces and releases the one or more nitrosonium cations under reactive conditions, wherein the reactive conditions are selected from the group consisting of a change in temperature, solvent polarity, and cavity shape, wherein the compound is a calix[4]arene compound selected from the group consisting of a cone and a 1, 3-alternate conformation specifically synthesized with a deep cavity.